The Huntsville Workshop

The Rossi X-ray Timing Explorer has been measuring the X-ray signals of gas spiraling down the gravitational wells to the compact stars in close binaries. Some signals from neutron stars, like pulsations, differ from those that come from black hole candidates, in accord with our expectation that the gas can crash on the surface of the neutron star and undergo nuclear reactions there, while it may disappear quietly into a black hole. Other signals are very similar, as would be the case for a disk precessing around the gravitational point without regard to the detailed nature of the compact star.

Accreting binary neutron stars and black holes are often seen at optical and radio wavelengths as well as with X-rays. Radio evidence is growing that gas is ejected in jets along the rotation axes, especially when the compact object is rotating fast and gas is flowing in from the companion star at a high rate. Correlations with the X-rays may show how.

Jean Swank is an astrophysicist at the Goddard Space Flight Center. She joined the Laboratory for High Energy Astrophysics in 1977 after working there as an NAS/NRC Resident Research Associate, returning to research from teaching positions at California State University at Los Angeles, Chicago State College, and Middle East Technical University. She obtained her Ph.D. in theoretical physics from the California Institute of Technology.

She has worked on data from many space missions, concentrating on galactic X-ray sources, from normal stars to compact stars. The X-ray Timing Explorer (RXTE), the largest area X-ray experiment that has flown, was launched at the end of 1995. During the long gestation of RXTE, Dr. Swank became its Principal Investigator and Project Scientist. RXTE has discovered new signatures of neutron stars and black holes. Dr. Swank has been concentrating on maximizing its few years of opportunity to study these phenomena.

Jean Swank: Zooming Around Neutron Stars and Black Holes

submitted by Gary Joaquin

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**NCA Events This Month**

The Public is Welcome!

NCA Home Page: [http://capitalastronomers.org](http://capitalastronomers.org)

**Fridays, October 6, 13, 20, and 27, from 7:00 - 10:00 P.M.**

Telescope-making and mirror-grinding classes at American University, McKinley Hall, Basement (Room 9), Nebraska and Massachusetts Avenues, N.W. However, on October 20 and 27, if the weather is clear, class may be canceled so that the instructor can go out star-gazing himself, instead, because the moon will be near new or 3rd quarter. Call or email Guy Brandenburg to confirm: 202-635-1860 or gbbranden@earthlink.net.

**Fridays, October 6, 20, 27, 8:30 P.M.**

Open nights with NCA’s 14-inch telescope at Ridgeview Observatory near Alexandria, Virginia; 6007 Ridge View Drive (off Franconia Road between Telegraph Road and Rose Hill Drive). Call Bob Bolster, (703) 960-9126 before 6:00 p.m.

**Saturdays, October 21, beginning 6:00 P.M. - Open House at Hopewell Observatory.** NCA members, families, and guests, only, are invited to enjoy the autumn sky at Hopewell Observatory. View the Milky Way and numerous deep-sky objects as well as the planets Uranus, Neptune, Saturn, and Jupiter (midnight in Sept., 10 p.m. in Oct.). On Oct. 21, sunset is at 6:23, astronomical twilight ends at 7:52, and the Moon rises at 2:06 a.m. See more information and directions on Page 3.

**Saturday, October 7, 5:30 P.M. - Dinner with the speaker and NCA members at the Cesco Trattoria, 4871 Cordell Ave., Bethesda MD.** See the map and directions on Page 6.

**October 7, 7:30 P.M. - NCA meeting, 4871 Cordell Ave., Bethesda MD.** See the map and directions on Page 6.

**October 7, 7:30 P.M. - NCA meeting, at Lipsett Auditorium in Building 10 at NIH, will feature Dr. Jean Swank: “Zooming Around Neutron Stars and Black Holes”**. See Page 4 for more National Capital area astronomical doings. To join NCA, use the membership application on Page 7.

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**Meteor Shower Showers**

**October Radiants**

Full Moon: October 13

<table>
<thead>
<tr>
<th>Radiant</th>
<th>Duration</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orionids (ORI)</td>
<td>October 15-29</td>
<td>Oct. 20 at 21:46 UT</td>
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**Minor Activity**

<table>
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<tr>
<td>Arietids (Autumn)</td>
<td>September 7-October 27</td>
<td>Oct. 8/9</td>
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<tr>
<td>Delta Aurigids (DAU)</td>
<td>September 22-October 23</td>
<td>Oct. 6-15</td>
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<tr>
<td>Eta Cetids</td>
<td>September 20-November 2</td>
<td>Oct. 1-5</td>
</tr>
<tr>
<td>October Cetids</td>
<td>September 8?-October 30?</td>
<td>Oct. 5/6</td>
</tr>
<tr>
<td>October Cygnids</td>
<td>September 22-October 11</td>
<td>Oct. 4-9</td>
</tr>
<tr>
<td>Draconids (GIA)</td>
<td>October 6-10</td>
<td>Oct. 9/10</td>
</tr>
<tr>
<td>Epsilon Geminids (EGE)</td>
<td>October 10-27</td>
<td>Oct. 18/19</td>
</tr>
<tr>
<td>Northern Piscids</td>
<td>October 5-16</td>
<td>Oct. 12/13</td>
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**Daylight Activity**

<table>
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<th>Duration</th>
<th>Maximum</th>
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</thead>
<tbody>
<tr>
<td>Sextantids</td>
<td>September 24-October 9</td>
<td>Sept. 30-Oct. 4</td>
</tr>
</tbody>
</table>

Source: [http://comets.amsmeteors.org/meteors](http://comets.amsmeteors.org/meteors)

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**Steve Robinson**

(Continued from page 1)

Steve Robinson
(Continued on page 3)
observed about one burst per day; a single observer may have access to only one or two per month. It is expected that HETE II will see more bursts.

The HST found very faint galaxies where the transients were observed. These galaxies have Z about 1 - 2. Almost certainly, gamma-ray bursts are something happening early in the universe. They appear to have some relation to high intensity star formation. All the energy of two solar masses might be converted to gamma rays. The energy from a supernova takes time to get out; gamma-ray bursts appear to be instantaneous.

CGRO had a resolution of 2° - 3° while a CCD camera has a field of only 10' - 20'. HETE II, which is to be launched October 6 of this year, will have a 10' error box and can alert the ground within 1 to 2 seconds. Another upcoming satellite, GLAST, to be launched in 2005, will get optical images immediately.

Robinson makes his charts from the USNO survey that goes to 22nd mag. These charts show the error circle as well as the central position for the burst. He also provides camera and burst-hunting procedures and software. He takes 65 - 70 min. to get the first image using an 18-inch telescope with an ST9 chip. Although data from BATSE were collected for 9 years, Robinson's Web site only includes the ones since March of this year.

Robinson sees his role as a messenger and an inviter. Two bursts have been captured by amateurs compared to 40 by professional observers. The Aquino group in Buffalo made the first amateur observation of a transient with a 40-year old homemade telescope and very poor hand guiding. (The mount could guide automatically for only 20 seconds.) They took 11 5-minute exposures that they added together. Arne Hendon at the USNO in Flagstaff provided substantial image enhancement. Amateur observations on Cloudcroft respond automatically to a request. Robinson hopes that NCA members will join him in searching for optical transients. There are, perhaps, three standard formats for the data in a burst announcement, but each format is easy to understand.

Exploring the Sky

Exploring the Sky, a joint presentation of the National Park Service and the National Capital Astronomers, continues Rock Creek Park near the Nature Center, in the fields just south of the intersection of Military and Glover Roads N.W.

The remaining sessions for this year are
10/28 – 7:30 P.M.
11/18 – 7:00 P.M.

Times are EDT except EST in November.

NCA members are urged to bring their telescopes to these sessions. Members without telescopes are also needed to answer questions from the public.

For additional information, call the Rock Creek Nature Center at (202) 426-6829 or NCA’s Joe Morris at joemorris@erols.com

You may also check the Internet sites:
http://www.nps.gov/rocr/planetarium
http://www.capitalastronomers.org

Open House at Hopewell

Saturday, October 21, beginning 6:00 p.m.
If you wish, come any time after 6:00 p.m. and bring your prepared picnic dinner.

Coffee, tea, and cocoa will be provided by the Hopewell Corporation.

Directions: (1) From the Beltway (I-495) go west on I-66 25 miles to Exit 40 at Haymarket onto U.S. 15. (2) Turn left on U.S. 15 at the end of the exit ramp. (3) Go 0.3 mile to traffic light, turn right onto Va. 55. (4) Go 0.8 mile to Antioch Road (Rt. 681) and turn right. (5) Go 3.2 miles to the end of Antioch Rd. and turn left onto Waterfall Road (601). (6) Go one mile and bear right onto Bull Run Mountain Rd. (Rt. 629). (7) Go 0.9 mile on 629 to narrow paved road at right with an orange pipe gate (Directly across from an entrance gate with stone facing). (8) Turn right through pipe gates, go 0.3 mile to top of ridge, and around the concrete building and towers. (9) Continue on dirt road through the white gate and woods a few hundred feet to the observatory. Park along the road short of the buildings.

If it is raining or hopelessly cloudy the event will be canceled. For further information call (703) 960-9126. Observatory phone: (703) 754-2317.
Other National Capital Area Meetings, etc.


Department of Terrestrial Magnetism (DTM) Carnegie Institute of Washington 5241 Broad Branch Road, N.W. Washington, D.C. Wednesdays at 11:00 a.m. in the Seminar Room of the Main Building.

October 13, Max Tegmark, University of Pennsylvania, “Zeroing in on Cosmological Parameters”

October 18, David E. Trilling, Department of Physics and Astronomy, University of Pennsylvania, “Linking our Solar System and Extrasolar Planetary Systems”

Call (202) 686 4370 to confirm that there have been no cancellations.
Source: http://www.ciw.edu/DTM-seminars.html

Goddard Scientific Colloquium — Due to construction in the Building 3 auditorium, the colloquia will be held at 3:30 p.m. on Fridays in the Goddard Space Flight Center Building 8 auditorium. If you plan to attend and do not have a NASA badge, please contact Carol Krueger, at (301) 286-6878, at least 24 hours beforehand.

LATE NEWS! Construction in Building 3 has been postponed. The Scientific Colloquium will be held at 3:30 p.m. on Fridays in the Building 3 auditorium until the work is re-scheduled.

Coffee and tea will be served in the Lobby at 3:00 p.m., courtesy of GEWA. If you plan to attend and do not have a NASA badge, please contact Carol Krueger, at (301) 286-6878, at least 24 hours beforehand.

October 13, Max Tegmark, University of Pennsylvania, “Zeroing in on Cosmological Parameters”

October 20, Max Tegmark, University of Pennsylvania, “Seasonal Variations, Climate Change and the Thermal History of Mars from Mars Global Surveyor Topography and Gravity”

Source: http://lheawww.gsfc.nasa.gov/users/djt/colloq/

Montgomery College’s Planetarium Fenton St. in Takoma Park, MD. October 21, Saturday, at 7:00 P.M. “How are Stars Born?”
Source: http://www.mc.cc.md.us/Departments/planet/

Northern Virginia Astronomy Club (NOVAC) meets at 6:00 p.m., the second Sunday of each month, at Lecture Hall 1 on the Fairfax campus of George Mason University, 703 803-3153.

October 8, “Telescopes and Tinkerers”, Here’s a chance to get a close look at what NOVAC members use to observe. Besides commercial scopes, many NOVAC members enjoy making their own equipment, whether building complete scopes or just tweaking commercial parts. Source: http://novac.com

University of Maryland Observatory on Metzerott Road. Open house on 5 and 20 of each month. Each open house program consists of a 20 to 30 minute slide presentation in the lecture hall (which is now air conditioned!) followed by telescope viewing (weather permitting) of various astronomical objects.

October 5, Thursday, two shows: 8:15 p.m., 9:00 p.m., Dr. Andrew Harris, “Searching for the Earliest Galaxies”

October 20, Friday, 9:00 p.m., Dr. Marv Leventhal, “Anti-particles at the Center of the Milky Way”. Info: (301) 405-3001 Source: http://www.astro.umd.edu/openhouse/

Greenbelt Astronomy Club meets on the last Thursday of each month (except holidays) at 7:30 p.m. at the Howard B. Owens Science Center, 9601 Greenbelt Road, Lanham, MD 20706. (Call the Science Center at 301-918-8750 or (301) 441-4605 to confirm meeting dates). Club meetings are open to the general public.

October 26, Dr. David A. Batchelor, “The Life Cycle of Stars” Source: lheawww.gsfc.nasa.gov/docs/outreach/gac/GAC.html

NASA/GSFC LEP Seminar Laboratory for Extraterrestrial Physics Brown Bag Seminar. The Laboratory for Extraterrestrial Physics (LEP) at NASA’s Goddard Space Flight Center conducts weekly science seminars Fridays at noon in Room 8 in Building 2 at Goddard. Since the seminar is conducted during the lunch hour, the audience often brings their lunch.

October 6, No seminar scheduled.


October 20, Ken LaBel, NASA/GSFC, Radiation Environment Mitigation: Part II

October 27, David Sibeck, JHU/APL, Laurel, Maryland, “Foreshock Preconditioning and its Magnetospheric/Ionospheric Effects”.
Source: http://lepjas.gsfc.nasa.gov/~seminar/lep_seminar.html

Goddard Engineering Colloquia All colloquia are held at 3:30 p.m. on Mondays in the Building 3 Auditorium, unless otherwise indicated below. Coffee and tea will be provided in the auditorium lobby starting at 3:00 p.m., courtesy of the Goddard Employee Welfare Association.

October 2, Bill Watson, GSFC Rapid Spacecraft Development Office, “Using the Spacecraft Supermarket: Results and Lessons Learned”

October 16, Norden Huang, NASA/GSFC, “Should We Bury or Praise Baron Jean Baptiste Joseph Fourier?”

October 23, Gary Hudson, Rotary Rocket Company, “Future Commercial Space Transportation: Challenges and Opportunities”

October 30, Howard McCurdy, “Space Policy in the Next Fifty Years: Will It Be Faster, Better, Cheaper?”

Note: Individuals not badged for entry into Goddard should obtain the current procedure by contacting Main Gate security at 301-286-7211. Source: http://ecolloq.gsfc.nasa.gov/sched.html

Deadline for November Star Dust: October 15

Please send submissions to Elliott Fein at elliott.fein@erols.com.
Text must be in ASCII, MSWord, or WordPerfect. Graphics in BMP is best. Thanks.
Mid-Atlantic Occultations and Expeditions, October and Early November 2000

by David Dunham

Asteroidal Occultations

<table>
<thead>
<tr>
<th>DATE</th>
<th>Day</th>
<th>EST</th>
<th>Star</th>
<th>Mag</th>
<th>Asteroid</th>
<th>dmag</th>
<th>s in.</th>
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<tbody>
<tr>
<td>Oct  9</td>
<td>Mon</td>
<td>19:29</td>
<td>GSC62722483</td>
<td>10.7</td>
<td>Interamnia</td>
<td>1.2</td>
<td>15  8</td>
<td>Carolinas</td>
</tr>
<tr>
<td>Oct  9</td>
<td>Mon</td>
<td>21:44</td>
<td>ACT68970229</td>
<td>10.3</td>
<td>Mashona</td>
<td>3.7</td>
<td>7  8</td>
<td>s. Florida</td>
</tr>
<tr>
<td>Oct 23</td>
<td>Mon</td>
<td>22:38</td>
<td>GSC57820030</td>
<td>10.0</td>
<td>Juno</td>
<td>0.5</td>
<td>24  8</td>
<td>Maine</td>
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*** Dates and times above are EDT, those below are EST or specified ***

| Nov  6 | Mon  | 0:05 | SAO 147199        | 9.2 | Myrrha   | 4.5  | 24  3 | s. Georgia        |
| Nov 20 | Mon  | 4:40 | mu Geminorum      | 2.9 | Sulamitis| 10.6 | 13  0 | Arizona; MST      |

The locations are approximate and could shift towards us with updates.

Lunar Grazing Occultations

<table>
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<tr>
<th>DATE</th>
<th>Day</th>
<th>EST</th>
<th>Star</th>
<th>Mag</th>
<th>% alt</th>
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<td>Oct 19</td>
<td>Thu</td>
<td>2:22</td>
<td>SAO 078867</td>
<td>8.4</td>
<td>62- 39</td>
<td>13N</td>
<td>Gaithersburg &amp; Ellicott C., MD</td>
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<tr>
<td>Oct 22</td>
<td>Sun</td>
<td>4:57</td>
<td>SAO 098907</td>
<td>8.5</td>
<td>27- 42</td>
<td>5N</td>
<td>Doswell, VA</td>
</tr>
</tbody>
</table>

**** Dates and times above are EDT, those below are EST ****

| Nov. 3 | Fri  | 18:41 | SAO 189638        | 7.7 | 46+ 31| 4S  | Williamsburg, VA & Raleigh, NC |
| Nov. 5 | Sun  | 18:44 | ZC 3284           | 7.0 | 65+ 35| 3S  | Germantown & Woodbine, MD |
| Nov. 7 | Tue  | 20:40 | Psc               | 4.4 | 83+ 42| 4S  | near Youngstown, OH |
| Nov. 7 | Tue  | 20:40 | 30 Psc            | 4.4 | 83+ 42| 4S  | near Youngstown, OH |
| Nov. 7 | Tue  | 20:40 | 30 Psc            | 4.4 | 83+ 42| 4S  | near Youngstown, OH |

Total Lunar Occultations

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<th>Star</th>
<th>Mag</th>
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<tr>
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<td>Fri</td>
<td>22:32</td>
<td>D X047994</td>
<td>7.0</td>
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<td>R 97 Tauri</td>
<td>5.1</td>
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<td>semi-regular variable</td>
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<td>6.0</td>
<td>73- 25</td>
<td>69S</td>
<td>Double, 2nd mag. 7.6, 0&quot;6, P318</td>
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<td>Oct 18</td>
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<td>R SAO 077596</td>
<td>7.3</td>
<td>73- 29</td>
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<tr>
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<td>6:13</td>
<td>R ZC 0905</td>
<td>6.9</td>
<td>71- 69</td>
<td>67N</td>
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<td>1:06</td>
<td>R 36 Gem</td>
<td>5.3</td>
<td>62- 25</td>
<td>86S</td>
<td>Sp. A2; ZC 1047; pos. close dbl.</td>
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<tr>
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<td>50- 35</td>
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<td>Sp. G5</td>
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**** Dates and times above are EDT, those below are EST ****

| Nov  1 | Wed  | 19:28 | D ZC 2777         | 6.7 | 29+ 15| 57N | Dbl., 2nd mag. 8.5, 8.0",PA 308 |
| Nov  7 | Tue  | 0:07  | D psi3 Aqr.       | 5.0 | 76+ 18| 77S | Sp. A0; ZC 3428 |

D following the time denotes a disappearance, while R indicates that the event is a reappearance. If the cusp angle (CA) is less than 30 deg., the time could be 5 minutes or more different for other locations. Mag is the star's magnitude. % is the percent of the Moon's visible disk that is sunlit, followed by a + indicating that the Moon is waxing and - showing that it is waning. Cusp Angle is measured around the Moon's circumference from either the north (N) or south (S) cusp, or horn; all events are on the dark side. Sp. is spectral type, indicating the star's color: O,B: blue; A,F: white; G: yellow; K: orange; M,N,S,C: red.

Phone the IOTA occultation line, 301-474-4945, for weather go/cancel decisions, and other updates, or check IOTA's Web site at http://www.lunar-occultations.com/iota for charts and more info.

David Dunham, 2000 Sep. 15
Getting to the NCA Monthly Meeting

Saturday, October 7
5:30 P.M. - Dinner with the speaker and NCA members at
Cesco Trattoria
4871 Cordell Ave.
Bethesda MD
phone: 301-654-8333
The restaurant has valet parking. Also, there is 2-hour metered parking on Cordell and Norfolk Avenues. (The meters are in use 9 AM – 10 PM except Sunday). The meters take nickels, dimes and quarters; 50¢ per hour.

7:30 P.M. - NCA Meeting at Lipsett Auditorium in Building 10 at NIH. Guest speaker: Dr. Jean Swank.

Directions to the Meeting Place
From Rockville Pike (Wisconsin Ave., Rt. 355)
To get to the parking lot at the South entrance (this will be the entrance for the next three years or so until they finish the new wing) from Rockville Pike, enter NIH at the Metro Entrance: South Drive (traffic light). Go straight ahead. At the third stop sign you will be at the parking lot, but you will have to make a left turn then a right to get to the entrance to the lot. Make a right turn into the lot. Building 10 is just north of the parking lot. Enter the building and follow the signs to the Lipsett Auditorium.

From Old Georgetown Rd., enter at Lincoln Drive (traffic light nearest to Suburban Hospital). Go straight ahead. The second stop sign is at a T. Bear left and the lot will be on the right. Make a right turn into the lot.

Metrorail Riders - From Medical Center Metro Station: Walk down the hill, past the bus stops. Continue straight past the anchor. At the second stop sign after the anchor, bear right up the incline into the entrance of Building 10, the tallest building on campus (walking time less than 10 minutes).

Taking the J2 or J3 buses from Silver Spring, get off at the Metro stop and follow the directions given for motorists from that point. If coming from Montgomery Mall, get off at the first stop in NIH, before the Clinical Center. There are signs near the ramp for the garage directing you into the side entrance. Walk straight through the building to the Lipsett amphitheater.

Directions to the Restaurant
Dinner before the meeting will be at 5:30 PM at
Cesco Trattoria
4871 Cordell Ave.
Bethesda MD
phone: 301-654-8333
If coming from the District, when going north on Wisconsin Avenue, ignore all signs for Woodmont Avenue until you pass Old Georgetown Road on your left. (Those signs put you on the wrong end of Woodmont Ave., which becomes one-way against you.) Once past Old Georgetown Rd., follow the directions below.

If coming from south of Bethesda, go north on Wisconsin Ave., turn left onto Cheltenham (traffic light). Go straight to go onto Norfolk Ave. The restaurant will be on your right as soon as you cross Cordell Ave. The entrance to the restaurant is on Cordell.

If coming from north of Bethesda, go south on the Rockville Pike (Rt. 355). As you pass NIH, make a right onto Woodmont Ave. Turn right onto Cordell Avenue. The restaurant is on your right, at the corner of Norfolk Ave. Its entrance is on Cordell.

After dinner, go North (Northeast) on Cordell Ave. to Woodmont Ave. Make a left onto Woodmont. Take Woodmont Ave. north to the traffic light at Rockville Pike (=Wisconsin Avenue) and turn left. Proceed north on the Rockville Pike and follow “directions to the meeting place” at the top of this page.
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$27 With Star Dust ONLY
$45 Junior membership with Star Dust and a discount subscription to Sky & Telescope.
$15 Junior membership with Star Dust ONLY
$100 Contributing member (with Sky & Telescope) ($43 tax-deductible)
$150 Sustaining member (with Sky & Telescope) ($93 tax-deductible)

Junior members only: Date of Birth: _______________ Only members under the age of 18 may join as juniors

Tax deductible contribution: _______ Thank You

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Mr. Jeffrey Norman,  NCA Treasurer,  5410 Connecticut Ave NW #717,  Washington DC 20015-2837
Inside this issue:

Jean Swank: Zooming Around Neutron Stars and Black

Review of Steve Robinson on Gamma-Ray Bursts

NCA Events This Month

Meteor Showers

Other National Capital Area Meetings, etc.

Mid-Atlantic Occultations and Expeditions

Directions with Map to Restaurant and Meeting